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PATENT COOPERATION TREATY

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From the INTERNATIONAL SEARCHING AUTHORITY

JUN 22 2005

To:
BLAKELY SOKOLOFF TAYLOR & ZAFMAN
Attn. Vincent, Lester J.
12400 Wilshire Boulevard, 7th Floor
Los Angeles, CA 90025
UNITED STATES OF AMERICA

BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP
LOS ANGELES

ENTERED
JUN 22 2005
STATUS DOCKETED

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL SEARCH REPORT AND THE WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY, OR THE DECLARATION

(PCT Rule 44.1)

Applicant's or agent's file reference P16682PCT	**FOR FURTHER ACTION** See paragraphs 1 and 4 below
International application No. PCT/US2004/032442	International filing date *(day/month/year)* 29/09/2004
Applicant INTEL CORPORATION	

Date of mailing *(day/month/year)* 16/06/2005

1. [x] The applicant is hereby notified that the international search report and the written opinion of the International Searching Authority have been established and are transmitted herewith.

   Filing of amendments and statement under Article 19:
   The applicant is entitled, if he so wishes, to amend the claims of the International Application (see Rule 46):

   When? The time limit for filing such amendments is normally 2 months from the date of transmittal of the International Search Report; however, for more details, see the notes on the accompanying sheet.

   Where? Directly to the International Bureau of WIPO, 34 chemin des Colombettes 1211 Geneva 20, Switzerland, Fascimile No.: (41-22) 740.14.35

   For more detailed instructions, see the notes on the accompanying sheet.

2. [ ] The applicant is hereby notified that no international search report will be established and that the declaration under Article 17(2)(a) to that effect and the written opinion of the International Searching Authority are transmitted herewith.

3. [ ] **With regard to the protest** against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

   [ ] the protest together with the decision thereon has been transmitted to the International Bureau together with the applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.

   [ ] no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. **Reminders**

   Shortly after the expiration of **18 months** from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau as provided in Rules 90*bis*.1 and 90*bis*.3, respectively, before the completion of the technical preparations for international publication.

   The applicant may submit comments on an informal basis on the written opinion of the International Searching Authority to the International Bureau. The International Bureau will send a copy of such comments to all designated Offices unless an international preliminary examination report has been or is to be established. These comments would also be made available to the public but not before the expiration of 30 months from the priority date.

   Within **19 months** from the priority date, but only in respect of some designated Offices, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase until **30 months** from the priority date (in some Offices even later); otherwise, the applicant must, **within 20 months** from the priority date, perform the prescribed acts for entry into the national phase before those designated Offices.

   In respect of other designated Offices, the time limit of **30 months** (or later) will apply even if no demand is filed within 19 months.

   See the Annex to Form PCT/IB/301 and, for details about the applicable time limits, Office by Office, see the *PCT Applicant's Guide*, Volume II, National Chapters and the WIPO Internet site.

Name and mailing address of the International Searching Authority	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Katrin Sommermeyer

NOTES TO FORM PCT/ISA/220

These Notes are intended to give the basic instructions concerning the filing of amendments under article 19. The Notes are based on the requirements of the Patent Cooperation Treaty, the Regulations and the Administrative Instructions under that Treaty. In case of discrepancy between these Notes and those requirements, the latter are applicable. For more detailed information, see also the *PCT Applicant's Guide*, a publication of WIPO.

In these Notes, "Article", "Rule", and "Section" refer to the provisions of the PCT, the PCT Regulations and the PCT Administrative Instructions, respectively.

INSTRUCTIONS CONCERNING AMENDMENTS UNDER ARTICLE 19

The applicant has, after having received the international search report and the written opinion of the International Searching Authority, one opportunity to amend the claims of the international application. It should however be emphasized that, since all parts of the international application (claims,description and drawings) may be amended during the international preliminary examination procedure, there is usually no need to file amendments of the claims under Article 19 except where, e.g. the applicant wants the latter to be published for the purposes of provisional protection or has another reason for amending the claims before international publication. Furthermore, it should be emphasized that provisional protection is available in some States only (see *PCT Applicant's Guide*, Annexes B1 and B2).

The attention of the applicant is drawn to the fact that amendments to the claims under Article 19 are not allowed where the International Searching Authority has declared, under Article 17(2), that no international search report would be established (see *PCT Applicant's Guide*, Volume I/A, paragraph 296).

What parts of the international application may be amended?

Under Article 19, only the claims may be amended.

During the international phase, the claims may also be amended (or further amended) under Article 34 before the International Preliminary Examining Authority. The description and drawings may only be amended under Article 34 before the International Examining Authority.

Upon entry into the national phase, all parts of the international application may be amended under Article 28 or, where applicable, Article 41.

When?

Within 2 months from the date of transmittal of the international search report or 16 months from the priority date, whichever time limit expires later. It should be noted, however, that the amendments will be considered as having been received on time if they are received by the International Bureau after the expiration of the applicable time limit but before the completion of the technical preparations for international publication (Rule 46.1).

Where not to file the amendments?

The amendments may only be filed with the International Bureau and not with the receiving Office or the International Searching Authority (Rule 46.2).

Where a demand for international preliminary examination has been/is filed, see below.

How?

Either by cancelling one or more entire claims, by adding one or more new claims or by amending the text of one or more of the claims as filed.

A replacement sheet must be submitted for each sheet of the claims which, on account of an amendment or amendments, differs from the sheet originally filed.

All the claims appearing on a replacement sheet must be numbered in Arabic numerals. Where a claim is cancelled, no renumbering of the other claims is required. In all cases where claims are renumbered, they must be renumbered consecutively (Administrative Instructions, Section 205(b)).

The amendments must be made in the language in which the international application is to be published.

What documents must/may accompany the amendments?

Letter (Section 205(b)):

The amendments must be submitted with a letter.

The letter will not be published with the international application and the amended claims. It should not be confused with the "Statement under Article 19(1)" (see below, under "Statement under Article 19(1)").

The letter must be in English or French, at the choice of the applicant. However, if the language of the international application is English, the letter must be in English; if the language of the international application is French, the letter must be in French.

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference	**FOR FURTHER ACTION**	see Form PCT/ISA/220 as well as, where applicable, item 5 below.
P16682PCT		
International application No.	International filing date *(day/month/year)*	(Earliest) Priority Date *(day/month/year)*
PCT/US2004/032442	29/09/2004	02/10/2003
Applicant		
INTEL CORPORATION		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 9 sheets.

[X] It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**
   a. With regard to the **language,** the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
      [ ] The international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).
   b. [ ] With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

2. [ ] **Certain claims were found unsearchable** (See Box II).

3. [X] **Unity of invention is lacking** (see Box III).

4. With regard to the **title,**
   [ ] the text is approved as submitted by the applicant.
   [X] the text has been established by this Authority to read as follows:

   6T FINFET CMOS SRAM CELL WITH AN INCREASED CELL RATIO

5. With regard to the **abstract,**
   [ ] the text is approved as submitted by the applicant.
   [X] the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regard to the **drawings,**
   a. the figure of the **drawings** to be published with the abstract is Figure No. 4, 5
      [ ] as suggested by the applicant.
      [X] as selected by this Authority, because the applicant failed to suggest a figure.
      [ ] as selected by this Authority, because this figure better characterizes the invention.
   b. [ ] none of the figures is to be published with the abstract.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2004/032442

Box No. IV Text of the abstract (Continuation of item 5 of the first sheet)

The present invention is a CMOS SRAM cell comprising two access devices, each access device comprised of a tri-gate transistor (400) having a single fin (410); two pull-up devices, each pull-up device comprised of a tri-gate transistor (400) having a single fin (410); and two pull-down devices, each pull-down device comprised of a trigate transistor (500) having multiple fins (410). A method for manufacturing the CMOS SRAM cell, including the dual fin tri-gate transistor is also provided. Due to the fins, the gate lenght is increased with respect to a planar transistor having the same area. Therefore, the cell ratio and static noise margin are increased, providing improved stability without increasing the cell area on the supply voltage.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2004/032442

Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest.

☒ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-16

   an SRAM cell wherein some transistors have a single fin and the pull-down transistors have at least 2 fins

   ---

2. claims: 17-33

   a method of forming a transistor having 2 fins using a sidewall image transfer method

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INTERNATIONAL SEARCH REPORT

International Application No
PCT/US2004/032442

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H01L21/8244 H01L27/11 H01L21/336 H01L29/423 H01L29/786

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 H01L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2003/042542 A1 (MAEGAWA SHIGETO ET AL) 6 March 2003 (2003-03-06) paragraphs '0003! - '0010!, '0015! - '0021!, '0080! - '0100!, '0106! - '0112!, '0145! - '0157!; figures 1-21,33-36	1-33

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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
9 May 2005	16/06/2005

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Neumann, A

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Form PCT/ISA/210 (second sheet) (January 2004)

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	LUDWIG T ET AL: "FinFET technology for future microprocessors" 2003 IEEE INTERNATIONAL SOI CONFERENCE PROCEEDINGS. NEWPORT BEACH, CA, SEPT. 29 - OCT. 2, 2003, IEEE INTERNATIONAL SOI CONFERENCE, NEW YORK, NY : IEEE, US, 29 September 2003 (2003-09-29), pages 33-34, XP010665921 ISBN: 0-7803-7815-6	1-16
Y	the whole document	20,21, 24-26
A		17-19, 22,23, 27-33
A	US 6 413 802 B1 (HU CHENMING ET AL) 2 July 2002 (2002-07-02) column 3, line 3 - column 5, line 40; figures 1-5	1-33
A	US 2003/102518 A1 (FRIED DAVID M ET AL) 5 June 2003 (2003-06-05) paragraphs '0001! - '0010! abstract	1-33
A	US 5 814 895 A (HIRAYAMA ET AL) 29 September 1998 (1998-09-29) abstract column 1, line 1 - column 2, line 24	1-33
A	US 5 821 629 A (WEN ET AL) 13 October 1998 (1998-10-13) abstract column 1, line 1 - column 2, line 19	1-33
X	US 2003/067017 A1 (IEONG MEIKEI ET AL) 10 April 2003 (2003-04-10)	17-19, 22,23, 27-33
Y	paragraphs '0031! - '0058!; figures 1-15	20,21, 24-26
A	US 4 996 574 A (SHIRASAKI ET AL) 26 February 1991 (1991-02-26) column 4, line 46 - column 7, line 33; figures 4-9	1-33
A	US 5 391 506 A (TADA ET AL) 21 February 1995 (1995-02-21) figure 7	1-33

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	IEONG M ET AL: "Three dimensional CMOS devices and integrated circuits" PROCEEDINGS OF THE IEEE 2003 CUSTOM INTEGRATED CIRCUITS CONFERENCE. (CICC 2003). SAN JOSE, CA, SEPT. 21 - 24, 2003, IEEE CUSTOM INTEGRATED CIRCUITS CONFERENCE.CICC, NEW YORK, NY : IEEE, US, vol. CONF. 25, 21 September 2003 (2003-09-21), pages 207-214, XP010671206 ISBN: 0-7803-7842-3 the whole document	1-33
A	NOWAK E J ET AL: "Scaling beyond the 65 nm node with FinFET-DGCMOS" PROCEEDINGS OF THE IEEE 2003 CUSTOM INTEGRATED CIRCUITS CONFERENCE. (CICC 2003). SAN JOSE, CA, SEPT. 21 - 24, 2003, IEEE CUSTOM INTEGRATED CIRCUITS CONFERENCE.CICC, NEW YORK, NY : IEEE, US, vol. CONF. 25, 21 September 2003 (2003-09-21), pages 339-342, XP010671230 ISBN: 0-7803-7842-3 the whole document	1-33
A	JONES E C: "Doping challenges in exploratory devices for high performance logic" ION IMPLANTATION TECHNOLOGY. 2002. PROCEEDINGS OF THE 14TH INTERNATIONAL CONFERENCE ON 22-27 SEPT. 2002, PISCATAWAY, NJ, USA,IEEE, US, 22 September 2003 (2003-09-22), pages 1-6, XP010676953 ISBN: 0-7803-7155-0 the whole document	1-33
A	PARK T ET AL: "PMOS body-tied FinFet (Omega MOSFET) characteristics" DEVICE RESEARCH CONFERENCE, 2003 JUNE 23-25, 2003, PISCATAWAY, NJ, USA,IEEE, 23 June 2003 (2003-06-23), pages 33-34, XP010655108 ISBN: 0-7803-7727-3 the whole document	1-33

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INTERNATIONAL SEARCH REPORT

International Application No
PCT/US2004/032442

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	NOWAK E J ET AL: "A functional FinFET-DGCMOS SRAM cell" INTERNATIONAL ELECTRON DEVICES MEETING 2002. IEDM. TECHNICAL DIGEST. SAN FRANCISCO, CA, DEC. 8 - 11, 2002, NEW YORK, NY : IEEE, US, 8 December 2002 (2002-12-08), pages 411-414, XP010626071 ISBN: 0-7803-7462-2 the whole document	1-33

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/US2004/032442

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2003042542 A1	06-03-2003	JP 9293793 A	11-11-1997
		DE 19633914 C1	07-08-1997
		KR 253923 B1	15-04-2000
US 6413802 B1	02-07-2002	NONE	
US 2003102518 A1	05-06-2003	NONE	
US 5814895 A	29-09-1998	JP 3534215 B2	07-06-2004
		JP 9181199 A	11-07-1997
		JP 9181200 A	11-07-1997
US 5821629 A	13-10-1998	US 5602049 A	11-02-1997
US 2003067017 A1	10-04-2003	US 6492212 B1	10-12-2002
		JP 2003163356 A	06-06-2003
US 4996574 A	26-02-1991	JP 2014578 A	18-01-1990
US 5391506 A	21-02-1995	JP 5218415 A	27-08-1993
		JP 5218416 A	27-08-1993
		JP 5343679 A	24-12-1993

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:

see form PCT/ISA/220

PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY
(PCT Rule 43*bis*.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/US2004/032442	29.09.2004	02.10.2003

International Patent Classification (IPC) or both national classification and IPC
H01L21/8244, H01L27/11, H01L21/336, H01L29/423, H01L29/786

Applicant
INTEL CORPORATION

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☒ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notifed the International Bureau under Rule 66.1*bis*(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA:

European Patent Office
D-80298 Munich
Tel. +49 89 2399 - 0 Tx: 523656 epmu d
Fax: +49 89 2399 - 4465

Authorized Officer

Neumann, A

Telephone No. +49 89 2399-6924

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US2004/032442

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

   ☐ This opinion has been established on the basis of a translation from the original language into the followin language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).

2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:

   a. type of material:

   ☐ a sequence listing

   ☐ table(s) related to the sequence listing

   b. format of material:

   ☐ in written format

   ☐ in computer readable form

   c. time of filing/furnishing:

   ☐ contained in the international application as filed.

   ☐ filed together with the international application in computer readable form.

   ☐ furnished subsequently to this Authority for the purposes of search.

3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating theret has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

4. Additional comments:

Box No. IV Lack of unity of invention

1. ☒ In response to the invitation (Form PCT/ISA/206) to pay additional fees, the applicant has:

   ☒ paid additional fees.

   ☐ paid additional fees under protest.

   ☐ not paid additional fees.

2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose not to invite the applicant to pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rule 13.1, 13.2 and 13.3

   ☐ complied with

   ☒ not complied with for the following reasons:

   see separate sheet

4. Consequently, this report has been established in respect of the following parts of the international application:

   ☒ all parts.

   ☐ the parts relating to claims Nos.

Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-33
	No:	Claims	
Inventive step (IS)	Yes:	Claims	
	No:	Claims	1-33
Industrial applicability (IA)	Yes:	Claims	1-33
	No:	Claims	

2. Citations and explanations

   see separate sheet

Re Item IV

1. This Authority considers that there are 2 inventions covered by the claims indicated as follows:

   I: Claims 1-16 directed to an SRAM cell wherein some transistors have a single fin and the pull-down transistors have at least 2 fins.

   II: Claims 17-33 directed to a method of forming a transistor having 2 fins using a sidewall image transfer method.

2. The reasons for which the inventions are not so linked as to form a single general inventive concept, as required by Rule 13.1 PCT, are as follows:

   The common feature of the above two sets of claims is an SRAM cell transistor having two fins. Such a transistor is known from the document US-A-2003 042542 (cf. figs. 1-19 and paras. 80-100). The special technical feature of the first set of claims is therefore the presence of transistors having only a single fin in the same SRAM cell. The special technical feature of the second set of claims is the use of a sidewall image transfer method for producing the two-fin transistor. Therefore the two sets of claims do not have a special technical feature in common nor are they linked by a single general inventive concept. The above two sets of claims and the corresponding groups of inventions thus lack unity in the sense of Rules 13.1 and 13.2 PCT.

Re Item V

1. Reference is made to the following documents:

D1: US 2003/042542 A1 (MAEGAWA SHIGETO ET AL) 6 March 2003 (2003-03-06)

D2: LUDWIG T ET AL: "FinFET technology for future microprocessors" 2003 IEEE INT'L SOI CONF. PROC. NEWPORT BEACH, CA, SEPT.29 - OCT.2, 2003, IEEE, US, 29 Sept. 2003 (2003-09-29), pp.33-34, XP010665921 ISBN: 0-7803-7815-6

D3: US-B1-6 413 802 (HU CHENMING ET AL) 2 July 2002 (2002-07-02)

D4: US 2003/102518 A1 (FRIED DAVID M ET AL) 5 June 2003 (2003-06-05)

D5: US-A-5 814 895 (HIRAYAMA ET AL) 29 September 1998 (1998-09-29)

D6: US-A-5 821 629 (WEN ET AL) 13 October 1998 (1998-10-13)

D7: US 2003/067017 A1 (IEONG MEIKEI ET AL) 10 April 2003 (2003-04-10)

D8: US-A-4 996 574 (SHIRASAKI ET AL) 26 February 1991 (1991-02-26)

D9: US-A-5 391 506 (TADA ET AL) 21 February 1995 (1995-02-21)

D10: IEONG M ET AL: "Three dimensional CMOS devices and integrated circuits" PROC. IEEE 2003 CUSTOM INTEGRATED CIRCUITS CONF. (CICC 2003). SAN JOSE, CA, SEPT.21-24, 2003, IEEE, US, vol. CONF.25, 21 Sept. 2003 (2003-09-21), pp.207-214, XP010671206 ISBN: 0-7803-7842-3

D11: NOWAK E J ET AL: "Scaling beyond the 65 nm node with FinFET-DGCMOS" PROC. IEEE 2003 CUSTOM INTEGRATED CIRCUITS CONF. (CICC 2003). SAN JOSE, CA, SEPT.21-24, 2003, IEEE, US, vol. CONF.25, 21 Sept.2003 (2003-09-21), pp.339-342, XP010671230 ISBN:0-7803-7842-3

D12: JONES E C: "Doping challenges in exploratory devices for high performance logic" ION IMPLANTATION TECHNOLOGY. 2002. PROC. 14TH INT'L CONF. ON 22-27 SEPT. 2002, PISCATAWAY, NJ, USA, IEEE, US, 22 Sept. 2003 (2003-09-22), pp.1-6, XP010676953 ISBN: 0-7803-7155-0

D13: PARK T ET AL: "PMOS body-tied FinFet (Omega MOSFET) characteristics" DEVICE RESEARCH CONF., 2003 JUNE 23-25, 2003, PISCATAWAY, NJ, USA, IEEE, 23 June 2003 (2003-06-23), pp.33-34, XP010655108 ISBN: 0-7803-7727-3

D14: NOWAK E J ET AL: "A functional FinFET-DGCMOS SRAM cell" INT'L ELECTRON DEVICES MEETING 2002 (IEDM) TECHNICAL DIGEST. SAN FRANCISCO, CA, DEC. 8 - 11, 2002, NEW YORK, NY : IEEE, US, 8

December 2002 (2002-12-08), pp.411-414, XP010626071 ISBN: 0-7803-7462-2

A. First group of claims (claims 1-16)

2. The application does not meet the requirements of Articles 33(1) and 33(3) PCT (inventive step).

2.1 D2 is regarded as being the closest prior art and discloses FinFETs that are "promising candidates" (cf. para "Introduction") for ever-decreasing device sizes. These FinFETs are produced having an even number of fins (see figs.1-2, para. "Technology", and FinFET processing level "FN" in fig.3 and para. "Methodology") using a sidewall image transfer method. The number of fins can be trimmed (see FinFET processing level "TR" in fig.3 and para. "Methodology").

2.2 In the para. "SRAM Issues" and the corresponding fig.5, D2 discloses a 6T SRAM cell comprising 2 FinFETs having each 3 fins and 4 FinFETs having each 1 fin, as is clear to the skilled reader upon considering the FN and TR levels of the rhs part of fig.5 that are involved in the manufacture of the SRAM cell shown in the lhs part of fig.5.

2.3 In the paras. "SRAM Issues", "Design Flow", and "Conclusions" as well as in fig.7, D2 discloses that one important issue is the "proper fin quantization" (cf. l.1 in the rhs column of p.33), i.e. the evaluation of the appropriate number of FinFET fins that are needed in order to obtain circuits having optimised parameters such as beta ratio, cell stability, noise (cf. para. "SRAM Issues"), and self-heating (cf. para. "Conclusions"). D2 also discloses that the results presented in that publication are merely there in order to prove the functionality of the design" (cf. para. "Conclusions") and that performance optimisation requires further evaluation (cf. last sentence on p.33) including the device width (i.e. fin) quantisation (cf. fig.7).

2.4 D2 therefore provides the skilled person with an incentive to manufacture devices such as 6T SRAM cells using FinFET technology. The skilled person also knows that the number of fins for the transistors is the important parameter that needs to be evaluated in order to optimise device performance.

2.5 The skilled person would therefore carry out routine calculations and experiments in

order to produce SRAM cells having FinFETs with an optimised number of fins.

The number of fins that is part of the subject-matter for which protection is sought in independent claims 1 and 16 does not provide any surprising technical effect (since D2 explicitly discloses that the beta ratio and cell stability need to be considered) and is therefore the result of routine experimentation but not the outcome of any inventive activity.

2.6 The subject-matter of independent claims 1 and 16 is therefore not inventive over a combination of D1 with the skilled person's routine procedure.

3. The same reasoning applies, mutatis mutandis, to the subject-matter of the corresponding independent claims 4 and 13, which therefore are also considered not to be inventive in the sense of Article 33 PCT.

4. The dependent claims do not contain any features that, in combination with the features of any claim to which they refer, meet the requirements of Article 33 PCT in respect of novelty and inventive step, see the documents D1-D14 and the corresponding passages cited in the search report.

In particular, it is pointed out that the dimensions featured in claims 3, 6-8, and 15 are very close to the ones disclosed in D2, D10 (fig.2), D11 (fig.7), D12 (para. V), D13 (cf. l.7 of the para. "Results and Discussion"), in line with the general trend in the technical area to reduce the device dimensions as much as possible, and as such do not provide any additional or surprising effect.

5. The application does not meet the requirements of Article 6 PCT (clarity).

5.1 Although claims 1, 4, and 13 have been drafted as separate independent claims, they appear to relate effectively to the same subject-matter and to differ from each other only with regard to the definition of the subject-matter for which protection is sought. Therefore the claims are not concise and do not meet the requirements of Article 6 PCT.

5.2 The feature "supply voltage" in the apparatus claims 4 and 12 relates to a method of using the apparatus rather than clearly defining the apparatus in terms of its technical features. The intended limitations are therefore not clear from these claims, contrary to the requirements of Article 6 PCT.

B. Second group of claims (claims 17-33)

6. The application does not meet the requirements of Articles 33(1) and 33(3) PCT (inventive step).

6.1 D7 (cf. paras.36-49 and 53 and figs.1-11) is regarded as being the closest prior art and discloses a method of forming a semiconductor device comprising the steps of:
- forming a silicon film 202 on a substrate 200,
- forming a sacrificial block 212 having laterally opposite sidewalls (para.37),
- depositing an insulating layer (SiN in para.37) over said layers 212 and 202,
- forming insulating spacers 214 on said sidewalls (paras.37-41),
- removing the sacrificial block 212 (figs.6-8 and related text, in particular para.46, first sentence),
- forming two silicon fins by etching through said silicon film 202 using said spacers 214 as a mask, wherein each fin has a top surface and a pair of laterally opposite sidewalls;
- removing said spacers 214.

6.2 The difference between the disclosure of D7 and the subject-matter of claim 17 lies in that:

- D7 does not explicitly disclose that an anisotropic etch is used to form the spacers 214; this type of etch, however, is routinely used in the art;

- the silicon layer 202 of D7 is not etched "to the substrate" as stated in l.9 of claim 17, which is a consequence of D7 disclosing an SOI device; no inventive merit can however by attributed to claim 17 because the skilled person knows that silicon films formed directly on a substrate are merely an alternative to SOI devices (cf. para.33) and are routinely chosen as a function of the device to be built; furthermore, D7 discloses the essential feature of the present application, viz. the formation of a silicon fin by means of the sidewall image transfer method;

- the last method step of D7 mentioned in item 6.1 above does not expose the top surface of each silicon fin; this difference between D7 and claim 17 is due to the fact

that the fins of D7 are covered by an ONO laminate; this ONO layer of D7 serves as a gate dielectric layer between the silicon fins 202 and the poly-silicon layer 230 that is deposited later on in the process according to D7; since the method according to the present application also involves the formation of a gate dielectric on the top surface of said silicon fins (cf. claim 27), both methods lead to the formation of the same device and differ merely in the sequence in which the steps are carried out; therefore no inventive activity is seen in claim 17; it is pointed out that claim 17 only claims several method steps but does not claim the order in which the steps are carried out.

6.3 The subject-matter of independent claim 17 is therefore not inventive over a combination of D7 with the routine knowledge of the skilled person.

7. The dependent claims do not contain any features that, in combination with the features of any claim to which they refer, meet the requirements of Article 33 PCT in respect of novelty and inventive step, see the documents D1-D14 and the corresponding passages cited in the search report.

In particular, it is pointed out that the dimensions featured in claims 20-21 and 24-26 are very close to the ones disclosed in D2, D10 (fig.2), D11 (fig.7), D12 (para. V), D13 (cf. l.7 of the para. "Results and Discussion"), in line with the general trend in the technical area to reduce the device dimensions as much as possible, and as such do not provide any additional or surprising effect.

8. The application does not meet the requirements of Article 6 PCT (clarity).

In claim 17 on p.19 in ll.14-15, it is not clear what is meant by "laterally opposite sidewalls of the nitride block", because the "nitride block" has not been defined before.